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Footpath Of Gods: A Recreational Walkway to Connect Mandi's Temples and Enhance the City's Quality of Life

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“THE FOOTPATH OF GODS”

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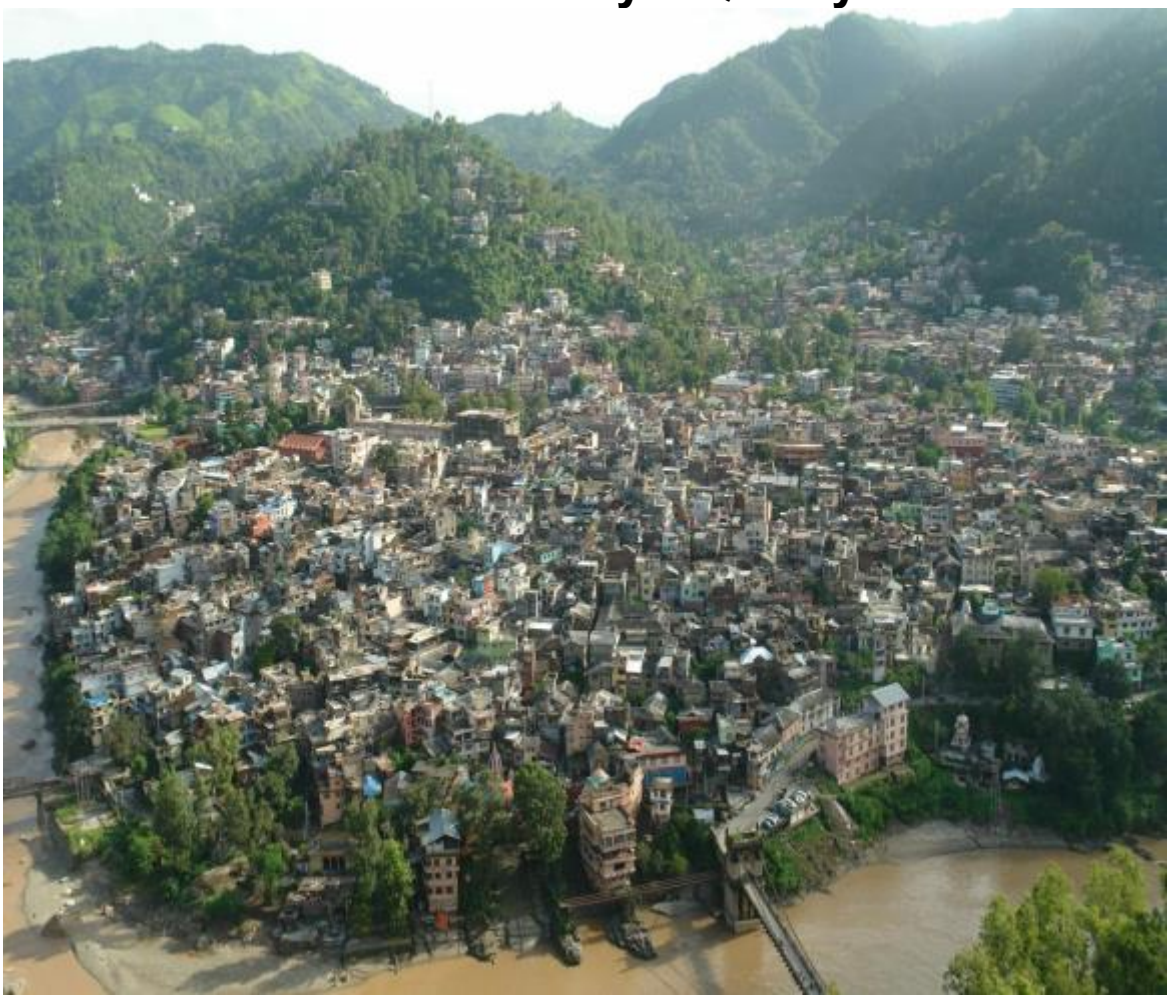

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Submitted:

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"THE FOOTPATH OF GODS"

A Recreational Walkway to Connect Mandi's Temples and Enhance the City's Quality of Life

An Interactive Qualifying Project
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in partial fulfilment of the requirements for the
degree of Bachelor of Science

by
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Date:
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Report Submitted to:

Dr. Bharat Singh Rajpurohit and Dericks P. Shukla
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Abstract

Automobiles, autorickshaws, mopeds and other modes of transportation cause congestion and pollution along popular routes beside the Beas and Suketi rivers of Mandi, and the overcrowding makes pedestrian mobility difficult. In this project, we developed a preliminary design for a circular, riverside recreational walkway connecting Mandi's main temples, which would promote the health of local people as well as their spiritual well-being.

Acknowledgements

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Authorship Page

Madison Beck contributed to the writing of each section of the report, the formula to calculate the total cost of the recreational walkway, formulating survey and interview questions, and design of the poster.

Susannah Gray contributed to the writing and editing of each section of the report, formulating survey and interview questions, making maps including the final projected layout of the walkway, design of the poster.

Alima Kargbo contributed to the writing of each section of the report, formulating survey and interview questions, each phase of the recommendations, analyzing the data from surveys, design of the poster, and formatting the entire report.

Sanjay Kumar contributed to setting up meetings with the Deputy of Superintendent of Police and Jr. Engineer of the Municipal Council, and to conducting surveys around Mandi town.

Sandeep Singh contributed to conducting interviews around Mandi town, translated interview questions to the Jr. Engineer of the Municipal Council, and took the pictures with the drone.

Table of Contents

Table of Figures

Table of Tables

Executive Summary

Separating the Mobility of Pedestrians and Vehicles in Mandi Town

The goal of this project is to research and propose the **preliminary design of a recreational walkway on the banks of the Beas river**. By proposing this walkway, we hope to create a solely pedestrian space, free from motor and bike traffic, which will enrich local tourism and promote the health and wellbeing of Mandi's residents and visitors. As public spaces, walkways provide the local population with a place to exercise, socialize, and navigate their surroundings. Walkways that are well-planned, well-maintained and safe provide a lasting, positive effect on city life.

The expansion of many Indian towns has been unplanned for decades. Just as many others, Mandi town, Himachal Pradesh falls under such criteria. With unstructured urban development, problems such as traffic congestion and pollution become a daily battle. Furthermore, the anticipation of an influx of roughly 6,000 students and supporting faculty within the next ten years will place new demands on an already strained town. In order to combat this, Mandi's urban planners may need to provide solutions to accessible navigation routes via low cost infrastructure. Our recreational walkway would not only positively impact the quality of life of local residents, but also help ease the influx of congestion within the city.

Figure 1. Visual representation of congested roads in Mandi town.

In order to complete our mission, we focused on three objectives. First, we determined the need for the walkway by conducting surveys with both Mandi's residents and visitors. In doing so, we were able to gauge interest from local people, as well as identify whether a walkway would best promote health and wellbeing as opposed to an alternative approach, for example, proposing the construction of a community park. Next,

after we had garnered interest for the project, we explored and determined various design specification for the walkway. We identified these specifications by utilizing information gathered from informal surveys as well as interviews. Lastly, using data from the aforementioned objectives and the 3D CAD design software, SolidWorks, we created a preliminary design of how the walkway might appear if it were built along the Beas and Suketi Rivers in Mandi.

Religion in Mandi Town

Mandi is commonly known as the "cultural capital of the Himachal Pradesh," which explains the many visitors drawn to the town each year. Tourists come to witness the unique architecture of Mandi's **81 historic temples**, as well as its remarkable culture and traditions. These places of worship can be found clustered in specific areas or distributed along either side of the Beas River, as shown by the red pins in the map below.

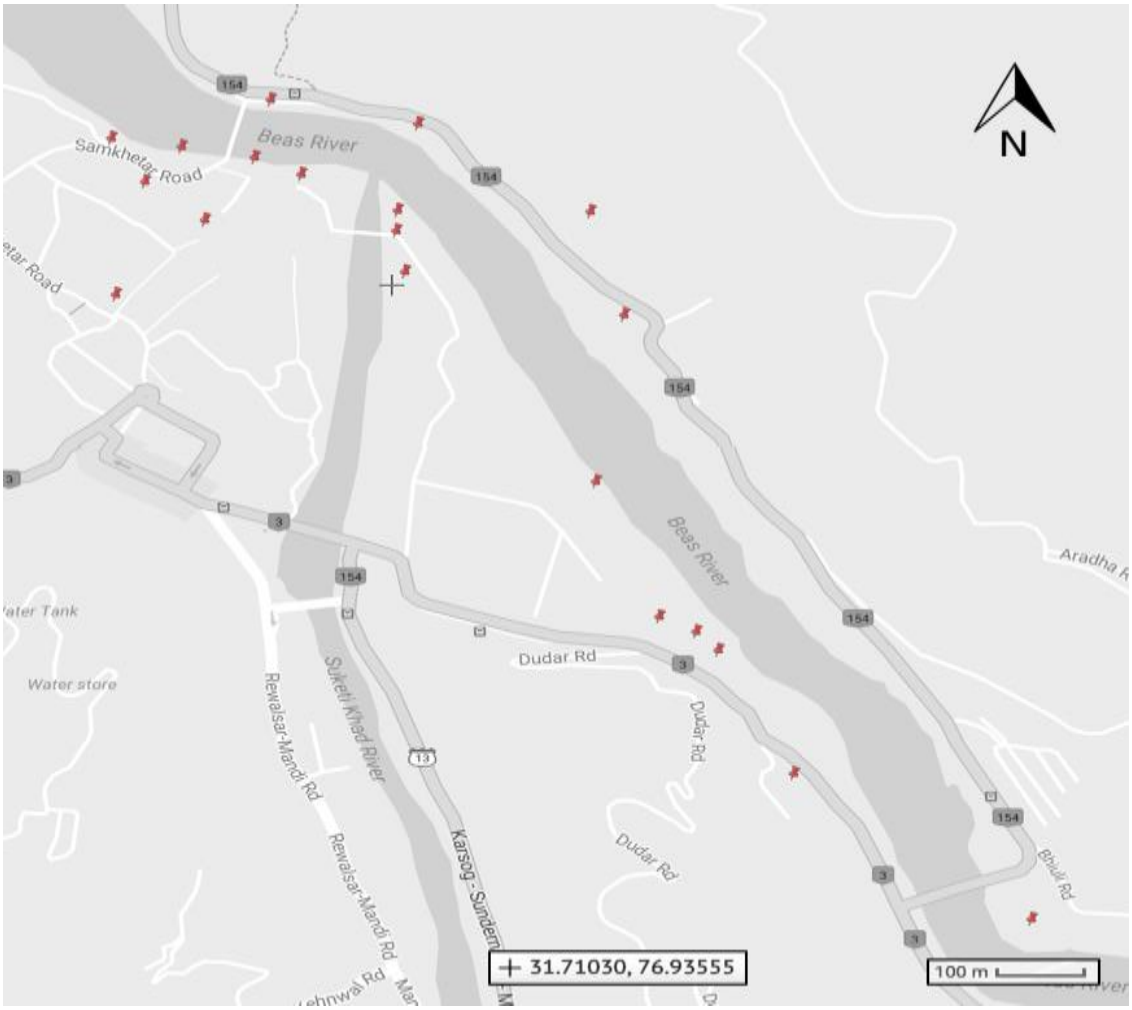

Figure 2. Map of Mandi town with places of worship marked by red pins.

Celebrations such as fairs, festivals and marriages are central to life in Mandi, as well. One of the most notable events in town is the Shivratri Fair, which is celebrated annually, between February and March. This specific fair pays tribute to Ishwari Sen, ruler of Mandi in the 1700s, after he had been captured and the state invaded. After twelve years, the invaders returned the state to Sen, and returned Sen to his land. He was met with a warm reception from his people, and proceeded to organize a grand celebration in honor of the day. The Shivratri fair is observed to this day, occurring during the Hindu festival of Shivaratri, a weeklong exaltation of the coming of more than 200 deities to Mandi. Masses from every corner of Mandi district travel to Mandi town to partake in this cultural excursion.

Figure 3. Shivaratri Fair in Mandi town

Methodology: Data Collection and Prototype Development

Our methodology consists of three objectives: 1. Determine the need for a walkway by Mandi's residents and visitors, 2. Determine and explore the design specifications of the projected walkway, and 3. Develop a preliminary design of the walkway. The data collection we carried out consisted of conducting surveys and interviews, while prototype development involved the exploration of ways to map and design the walkway. We then following through with the chosen method. In our case, we made use of SolidWorks 3D CAD computer-aided design software to produce this design. Proper completion of these objectives was essential to the development of an accurate preliminary design for the recreational walkway. Their respective methods are outlined in greater detail below.

Table 1. Objectives and Associated Strategies.

Objectives	Methods
Determine the need for a walkway by Mandi's residents/visitors	• Survey Mandi's residents and visitors • Interview Deputy Superintendent of Police of Mandi
Determine and explore the design specifications of the projected walkway	• Survey Mandi's residents and visitors • Interview Mandi's Jr.Engineer of the Municipal Council

Develop a preliminary design for the walkway	• Utilize ScribbleMaps and SolidWorks software for mapping and design • Estimate rough cost of walkway • Reflect on completed surveys of Mandi's residents and visitors

Our first objective entails **determining the need for a walkway** by Mandi's residents and visitors. To do so, we surveyed both residents and visitors in Mandi to gauge whether the implementation of a recreational walkway would best address the issues hindering pedestrian mobility. In order to collect data from a diverse population, we decided on a **large sample size of 145 subjects**. To acquire responses from a range of demographics, we surveyed subjects from different regions of Mandi. For example, Indira market yielded responses from many visitors to Mandi, while areas near the proposed location yielded responses from people we believe would be most-affected by the implementation of the walkway. The survey asked for input on topics such as the need for a walkway, safety features, preferred aesthetics, as well as which temples one visits most often.

Figure 4. Main survey locations. Orange lines represent the major bridges in Mandi town: Victoria Bridge, Pedestrian Footpath, Suketi Bridge, and Bhuili Bridge (left to right).

To accomplish our second objective -- to determine and explore various design specifications of the projected walkway -- we again looked to the results of the surveys completed by Mandi residents and visitors. This data was used to arbitrate the population's general preferences. In addition to field surveys, we provided an online survey to the **IIT Mandi community**. Again, we requested input on the preliminary walkway design,

receiving **81 online responses**. After we had gathered and analyzed the survey information, we proceeded to hold interviews. We first conducted an interview with Hitesh Lakhanpal, the **Deputy Superintendent of Police** (DSP), who provided us with a unique point of view and data crucial for proper recommendations. Mr. Lakhanpal was able to elaborate on the necessity of certain **safety** features, provide seasonal water levels of the Beas River, as well as offer information on the current traffic conditions in Mandi.

In addition, our first interview, we were able to conduct two interviews with Parveen Kumar, the **Junior Engineer** of Mandi's Municipal Council. Mr. Kumar generously recommended dimensions, materials and additional information regarding permits necessary for construction. The information from Mr. Kumar allowed us to accurately incorporate particular design specifications and stipulations that are standard for Mandi town.

In order to complete our final objective, we applied the prospective origin, ideal walkway dimensions, and designated features to SolidWorks 3D CAD software to create a preliminary 3D model of the walkway. Finally, we were able to determine a rough cost estimate for features of the preliminary design, and provide a comprehensive formula for total cost.

Results and Discussion

Results from 145 surveys as well as interviews with two government officials have helped us determine the plausibility of and possibilities for a recreational walkway within Mandi town.

Citizens of Mandi Would Like a Recreational Walkway Along the Beas River

To begin, one of the most telling questions of our survey asked for a rating of road congestion within Mandi town. Because a majority of the responses were above "5", we concluded that traffic congestion in Mandi is above average. We then proceeded to ask local people how they commonly navigate Mandi, and the time it takes to commute to various locations. With the knowledge that Mandi is already a densely populated town for its size, we also inquired if the local people would rather use a recreational walkway instead of the roads, to which **87% of subjects answered "Yes".** This verifies that there is an interest and a need for the construction of a walkway in Mandi town. The 13% of subjects who responded, "No," resulted from locals who have either had a bad experience using a walkway or are unsure of what a walkway is.

Given that there were a large number of Mandyalis interested in the construction of a walkway, we further inquired about whether or not they have **used a recreational walkway** in the past, as well as how they would describe their experiences. **54%** of the responses that answered "Yes" to having used a walkway before were either *Satisfied* or *Very Satisfied.* This data is shown in the figure below.

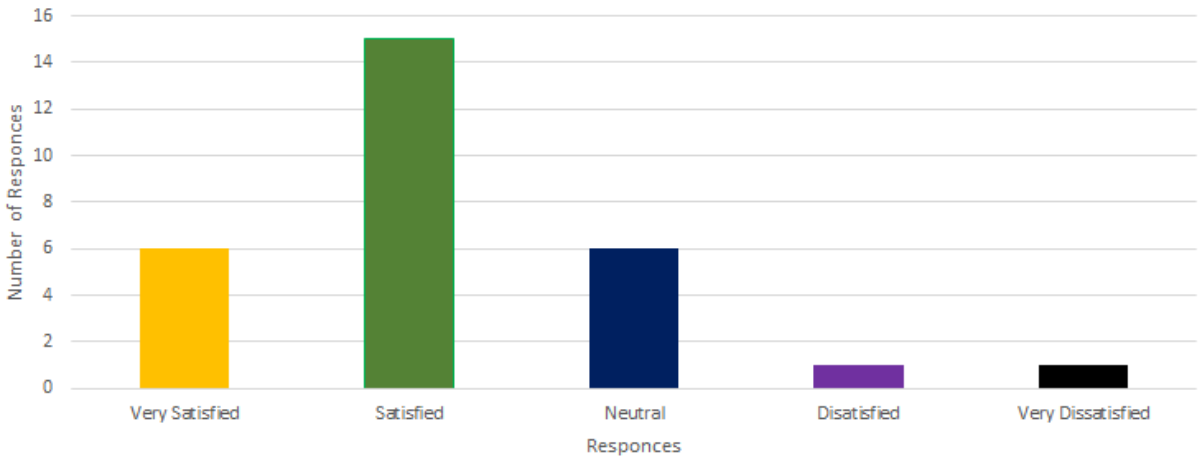

Figure 5. The majority of subjects who have used a walkway before were either "Satisfied" or "Very Satisfied" with their experience.

After collecting evidence of both a want and need for the recreational walkway as outlined by the surveys, we moved forward and conducted an interview with the **Deputy Superintendent of Police (DSP)** in Mandi, Hitesh Lakhanpal. When asked to speak about traffic congestion, the DSP remarked that, "Traffic **congestion is above average**, especially in the months of fairs and festivals. It is a daily problem that Mandi faces." After explaining the goals and objectives which we've undertaken, Mr. Lakhanpal was both receptive and supportive of the construction of a recreational walkway. Mr. Lakhanpal added further that the **walkway must add to the beautification** of Mandi, and that the it must also appeal to its daily influx of locals and visitors. This interview facilitated in solidifying the purpose of and need for the recreational walkway.

The New Pedestrian Walkway Should Cater to Recreation and Religious Events

With survey responses as our foundation, we formulated a list of design specifications; we made stipulations about **aesthetics** as well as **amenities** that will be provided along the path. One project-defining decision came from the survey question which inquired about how people might use the walkway. **91.4%** of subjects answered that they would take advantage of its potential for **recreational** use, or physical **exercise**. These responses from locals and visitors express that this walkway will effectively promote healthy lifestyles.

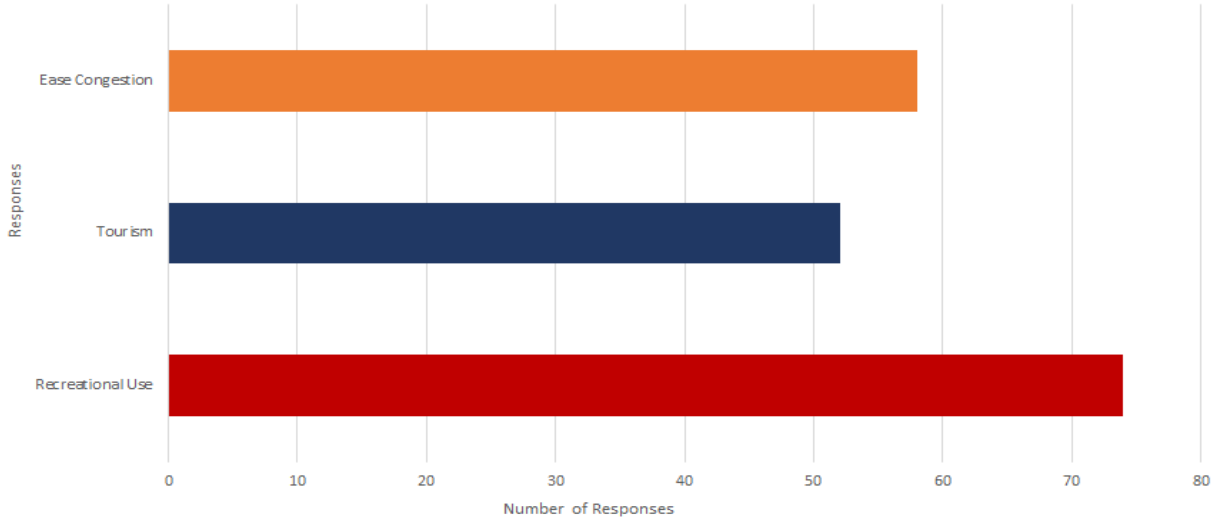

Figure 6. Subject response on the positive impact the recreational walkway will have in Mandi town.

While analyzing surveys, it was crucial to consider the residents' preferred areas of worship. When asked which place of worship one visits most often, there were a variety of answers: Tarna Temple, Chala Temple, Bhimakali Temple, Triloknath Temple, Guru Gobind Singh Ji Gurudwara, and Neelkanth Mahadev Temple. Having a sense of connectivity between areas of worship makes for a spiritually balanced experience. Not only will the walkway connect religious temples, it will also connect the town as a whole. Currently, the city of Mandi has a few existing pathways that connect different areas of Mandi. Existing walkways are shown in figure below.

Figure 7. Existing paths and places of worship along the Beas river in Mandi town.

The Recreational Walkway Will Cater to Mandi's Tourism Industry

The decision to survey visitors in addition to the residents of Mandi was deliberate. As the town draws tourists from all corners of Himachal Pradesh to witness its unique architecture and rich religious history, proper pedestrian accessibility is essential for the growth of its tourism industry. Not only will the recreational walkway provide a space to walk in order for foot-traffic to access all of the urban tourism activities made available by the town, but it will be a destination itself. It is our hope that, with the follow-through of this project by the town of Mandi, the scenic and leisurely ambiance of the Beas River walkway will become a landmark for the town in the years to come.

Mandi Residents Desire Specific Features and Amenities Along the Walkway

Survey subjects also expressed interest in various recreational features and amenities. When asked with whom they might use the walkway, in figure #, **84%** of the responses answered that they'd **use it with friends**. Considering this response, we will propose a walkway width which can accommodate a group of 4 people.

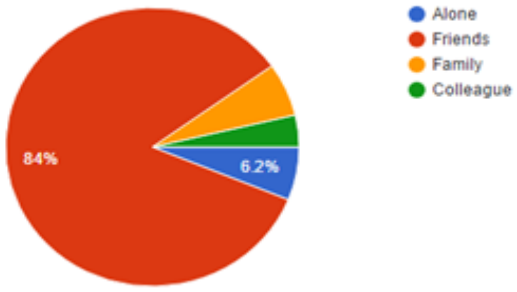

Figure 8. Survey subjects express they'd use the recreational walkway with friends.

We proceeded to inquire about features preferred by the local people. This question yielded a variety of responses. Figure 9 below outlines responses for the most popular features: benches, street lights, fountain, swing, and other.

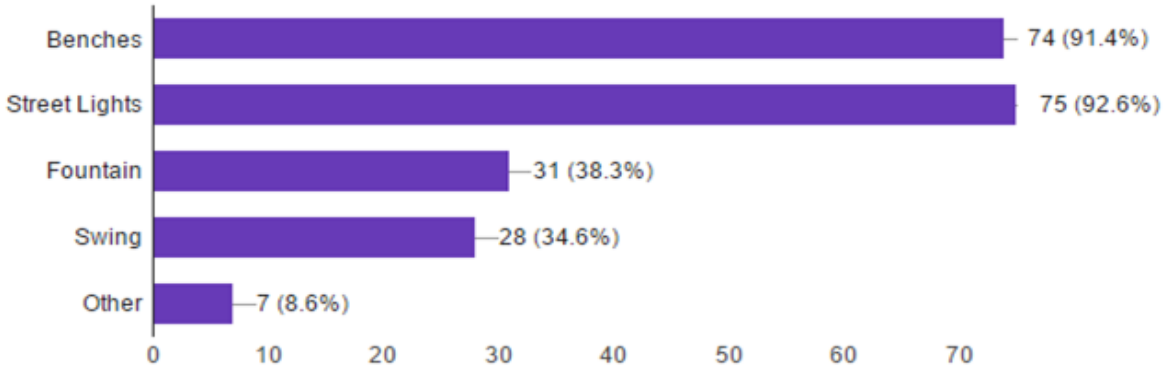

Figure 9. Different types of recreational features people would like to see on the walkway.

Initially, we had proposed the idea of a bicycle lane to survey subjects, though through speculation and further investigation we recognized that regulating an area solely for bicycles would not be plausible; without 24-hour enforcement by police, the prospect of stopping every motorcycle, moped and other vehicle from entering was not likely. Thus, we made the informed decision to maintain the walkway as a solely pedestrian space. Removing motor vehicles and vendors should add to the tranquility of the area, promoting relaxation. It also allows more room for other physical activity, such as running and potential fitness stations.

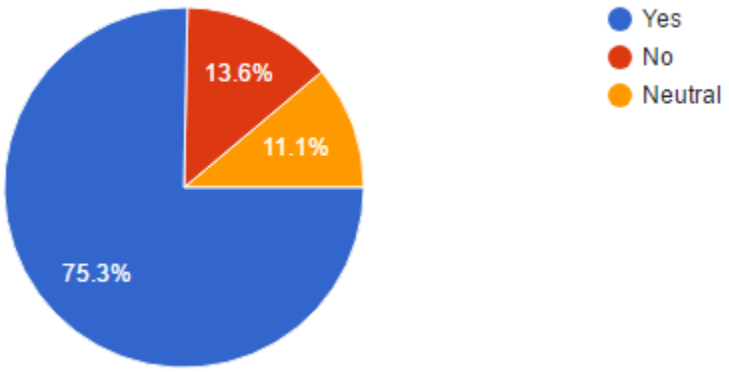

Figure 10. Most survey subjects would prefer a bike lane on the walkway.

The Jr. Engineer of the Municipal Council recommended similar features to those we had already decided on, and others, in addition (ex. Bathrooms, railings). Based on survey responses and interviews, we have decided on the following features as necessities:

- **Benches**
- **Street Lights**
- **Bathrooms**
- **A Railing**
- **Cow Traps**

Each feature ultimately adds to the goal of creating a space for pedestrians to enjoy for leisure activity. The benches provide a comfort factor to the footpath, allowing people to pause and relax. The street lights enable 24/7 usage of the walkway, the bathroom's act as luxury amenity, a railing is a safety feature that prevents people from mistakenly falling from the walkway, and the cow traps prevent cattle as well as other modes of transportation, such as mopeds, from entering the walkway.

No Commercial Activity Will Be Allowed on the Walkway

During the consideration of our preliminary design, we entertained the idea of allowing vendors along the walkway. These vendors would not only generate revenue for themselves, but could also contribute to financing the walkway. The feedback we received from the surveys was marginally for the construction of a walkway that does not allow vending; 39.5% of subjects responded "No." After receiving such a mixed response, we consulted the DSP and the Junior Engineer of the Municipal Council during their respective interviews. The responses were consistent with the majority rule of the survey question; neither the DSP nor Junior Engineer of the Municipal Council were advocates of allowing vendors on the walkway. The most compelling reason was to avoid overcrowding. Therefore, our preliminary design does not call for nor allow vending along the walkway. Our aim is to foster a relaxing environment for locals to use the walkway at leisure.

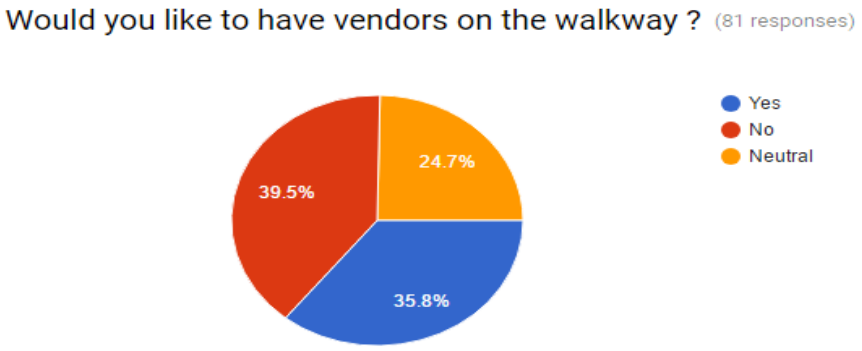

Figure 11. Local residents/visitors show that this walkway should solely be for pedestrian use.

Proposed Walkway

The preliminary design of the recreational walkway is projected to cross two main bridges in Mandi town: The Victoria Bridge and the Bhuili Bridge. The figure below shows the entirety of the recreational walkway with existing and nonexistent paths. The legend indicates the markers for places of worship and toilets along the walkway. The map also illustrates various access points: areas designated for one to enter or step off of the walkway.

The total length of the proposed walkway is approximately 4.8km, of which 0.87km are preexisting (green) and 3.93km must be constructed (dashed black). The red lines on the map in *Figure 12* represent areas where construction may be complicated or impossible due to rocky terrain in specific areas.

Some locations outlined in red may require the attention of the Archeological Survey of India (ASI). Many stretches of the walkway are in close proximity with temples, and the ASI prohibits activity within 100m of these temples, while declaring the next 200m radius a "regulated area." The regulated area prohibits construction in its space unless permission is obtained from the Director-General, for which one must apply using Form VII

at least three months prior to the date for which construction is planned. If being granted this license isn't practical, it is still possible to build on the very banks of the river.

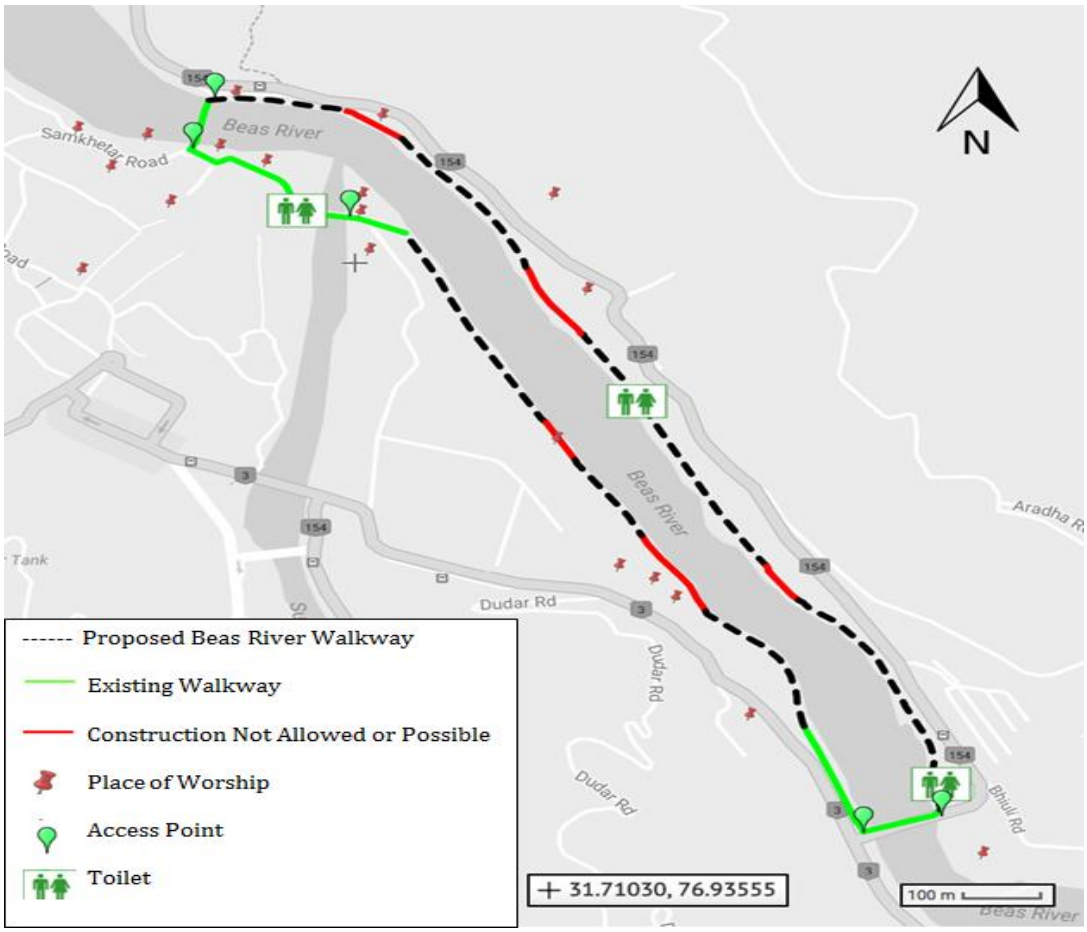

Figure 12. Projected layout of the entire walkway including existing parts of the walkway and need to be built.

For the visual of the preliminary design, we have chosen to focus on two specific areas of the circular walkway. These areas were not chosen at random, but rather because, at these locations, national highways frame both banks of the Beas River.

Figure 13. Map View of National Highway 154 (left side Beas River) and National Highway 3 (right side of Beas River through the middle of Mandi town and crossing the Suketi Khad River)

These two major highways, NH 154 and NH 3, are constantly congested with vehicles, pedestrians and vendors. This crowdedness makes navigation of Mandi difficult, whether someone is commuting, on a walk for leisure, or exercising. The DSP informed us that Mandi's residents typically exercise early in the morning and are often confined to using only small portions of the roads. Furthermore, we have chosen these two locations because of their proximity to the most visited places of worship based on the 145 surveys. This walkway will not only promote health and provide an alternate commute, but will, just as notably, make it easier for locals to access their respective temples or places of worship.

Preliminary 3-Dimensional Model of Recreational Walkway by the Victoria Bridge

After compiling the aforementioned design specifications, we were able to develop a preliminary 3D model of one section of the proposed walkway, which is displayed in Figures 14 and 15 below. The modeled section is adjacent to the east access point of Victoria Bridge. This model includes the desired featured amenities discussed throughout this report, such as railings, light fixtures and benches.

Figure 14. Perspective view of the 3D model located on rocky terrain located on the east bank of the Beas river. Pictured in the center, above the model is Shiv Mandir (religious temple).

Figure 15. Top down view of 3D model located on rocky terrain by the Victoria Bridge. Also pictured is Shiv Mandir (religious temple).

Estimated Cost of the Walkway

Table 2 below demonstrates the estimated total cost of the recommended features for the complete preliminary design which follows the layout illustrated in *Figure 15*.

Table 2: Estimated cost of each feature needed for the recreational walkway

Preliminary Features	**Estimated Cost (INR)**
96 Concrete Benches	768,000
192 Solar Street Lights	3,840,000
3 Restrooms	300,000
15,748 ft. of Stainless Steel Railing	7,874,000
2 Cattle Traps (Victoria Bridge Access Points)	30,000
3 Cattle Traps (Bhiuli Bridge Access Points)	30,000
Total	**12,842,000**

Each of the following design features were decided based on recommendations given by the Jr. Engineer of the Municipal Council of Mandi.

Given standard distances between each individual bench, street light, restroom, and cow trap, we were able to calculate the amount of each individual feature mandated by a walkway of **4.8km**. Further costs include labor, construction costs, the cost of materials, and the prospective cost if privately owned property must be acquired by the town. It is possible to purchase private property from its owners if they are willing to be compensated at double its market value.

The equation below can be used to calculate the final total cost of the walkway:

$$(Preliminary\ Features) + (Cost\ of\ Materials) + (Construction\ Costs) + 2(Market\ Value\ of\ Privately\ Owned\ Property*) + (Labor) = Total\ Cost\ of\ Walkway$$

Recommendations

With the information gathered from the surveys and interviews, we were able to produce a preliminary list of features and design specifications that should be included in the walkway. We have also given a proposed location. With the data and preliminary design, we put forth a 3-phase process that summarizes the steps which we recommend be taken to further develop this project.

Features Recommended for the Recreational Walkway

We developed a list of preliminary features which are tailored to meet the general wants and needs of the public.

Table 3: Recommendations of design features

Preliminary Features	Recommendations
Benches	We recommend concrete benches rather than wood or steel due to its durability and lower cost.
Solar Street Lights	We recommend an investment in solar street lights rather than standard street lights due to their energy efficiency and the money which will be saved long-term.
Restrooms	We recommend the addition of 3 restrooms, each approximately 1.56KM apart.
Railings	We recommend stainless steel railings for their durability.
Cattle Traps	We recommend the incorporation of cattle traps. Considering that the east side of the walkway is projected to be 2m wide, we recommend that the two access points by Bhiuli bridge contain two vertical poles, .66M apart. Alternatively, the west side of the walkway is projected to be 3m wide with three access points, therefore we suggest constructing 3 vertical poles that are about .66M apart at each access point. The standard width of the handlebars on a bicycle is approximately .75m, so we recommend a distance between poles no larger than that. The average standard height of these cow traps are 1.20m which is also just above the standard height of a bicycle.

Concrete	We recommend the use of concrete for this walkway. The cost of concrete, given to us by Jr. Engineer of the Municipal Council, is approximately 3,200 rupees/m^3 . It was also recommended to us that the east side of the river include a steel frame for reinforcement due to the nature of its design. This must also be considered in the aforementioned total cost.

Furthering the Development of the Recreational Walkway

Given that planning for and building a walkway is an extensive process, we have split our recommendation into three phases for the city of Mandi to consider. The first is solely relevant to the west bank of the Beas river. This bank is primarily flat, forested land, and therefore construction in this area is least difficult. Unlike the first phase, the second phase of the walkway puts forth more of a challenge; the west bank of the Beas river consists of rocky terrain, stretches of privately owned property, and is adjacent to a major highway. Finally, the last phase is meant to serve as a set of recommendations for the maintenance of the walkway.

Phase 1: Construct a walkway on the left side of the Beas River.

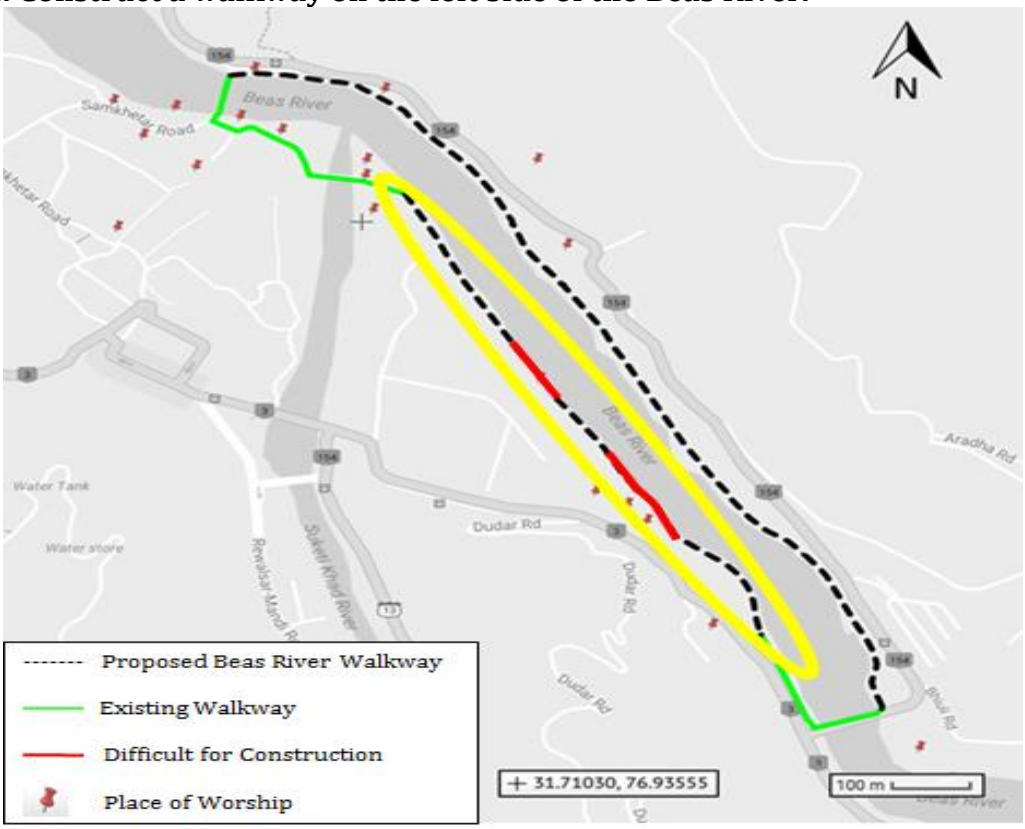

Figure 17. Orthographic view of existing and proposed walkway paths with temples included. The circular yellow line shows the focus of this phase.

Step 1: Refer back to "Estimated Cost of the Walkway" of Objective 3 to determine needed budget for materials and features for the recreational walkway.

Step 2: Compensation may need to be given to private property owners, given their willingness to give up land. Consulting the landowners and residents of this area will be crucial to the entirety of this phase.

Step 3: Begin construction of the walkway at the southern existing path on the left side of the Bhiuli bridge. Work toward areas in which construction may be difficult i.e. private property or temple in close proximity.

Step 4: Similarly, construct the walkway with an origin at the northern existing path's termination until the red marked lines.

Phase 2: Construct a walkway on the right side of the Beas River.

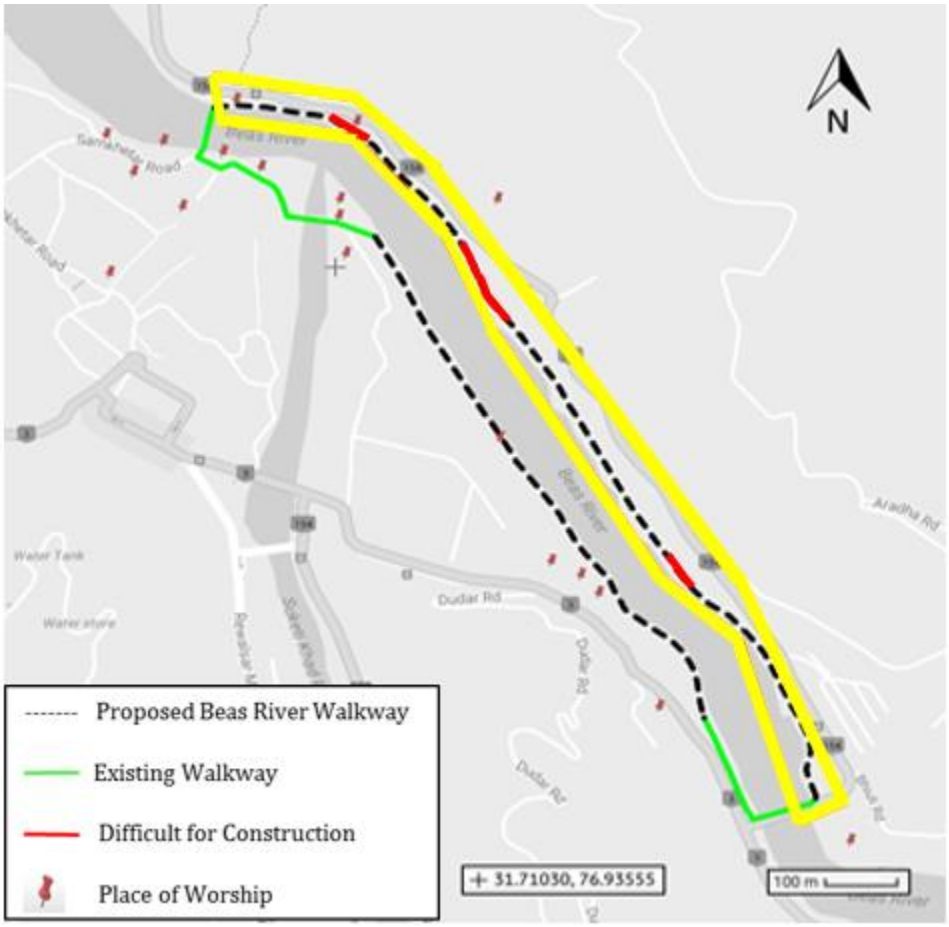

Figure 18. Orthographic view of existing and proposed walkway paths with temples included. The circular red line shows the focus of this phase.

Step 1: Refer back to "Estimated Cost" of Objective 3 to determine needed budget for materials and features for the recreational walkway.

Step 2: Compensation may need to be given to private property owners, given

their willingness to give up land. Consulting the landowners and residents of this area will be crucial to the entirety of this phase.

Step 3: Use a "hanging wall" method with steel supports for areas with rocky terrain.

Step 4: Because there are no existing paths on the east bank of the river, begin construction at the left side of Bhiuli bridge and work up to red sections of the map above. Work toward Victoria Bridge (where walkway terminates).

Phase 3: Maintenance of the recreational walkway

Figure 19. Par Course fitness bars for exercise

Step 1: Designate a crew of laborers to upkeep the appearance of the walkway.

Step 2: Include a few par course fitness bars for residents and visitors to use for exercise.

We recommend that the City of Mandi take this information into consideration and within the next year, entertain the planning/construction of the recommended sections of the walkway.

Conclusion

In the field, surveys of residents and visitors alike identified a want and need for a recreational walkway within Mandi town. The goal is for the walkway to be used for leisure, serving as a means of promoting the health and of Mandi's residents and visitors through physical activity. Alternatively, the walkway is also designed to improve connectivity between various temples within Mandi town, namely the Shiv Mandir and the Triloknath Temple. Finally, it is our hope that the walkway becomes a popular destination within Mandi, so as to draw visitors and residents alike. In this way, the walkway will contribute to Mandi's economy, not only by the creation of jobs during planning and construction, but afterward, as well.

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Supplemental Materials

Project Presentation Poster

"THE FOOTPATH OF GODS"

A Recreational Walkway to Connect Mandi's Temples and Enhance the City's Quality of Life

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ABSTRACT

Automobiles, autorickshaws, mopeds and other modes of transportation cause **congestion and pollution** along popular routes beside the Beas and Suketi rivers of Mandi town, and the **overcrowding** makes pedestrian mobility difficult. In this project, we developed a **preliminary design for a circular, riverside recreational walkway** connecting Mandi's main temples, which would **promote the health of local people** as well as their **spiritual wellbeing.**

OBJECTIVES & METHODOLOGY

Determine the need for walkway by Mandi's residents/visitors and government officials	Determine and explore the design specifications of the projected recreational walkway	Develop a preliminary design for the walkway
• Survey Mandi's Residents and Visitors • Interview Deputy Superintendent of Police in Mandi	• Survey Mandi's residents and Visitors • Interview Mandi's Jr. Engineer of the Municipal Council	• Utilize Sribblemaps and SolidWorks for walkway layout • Reflect on completed surveys of Mandi's residents and visitors • Estimate rough cost of walkway

RECOMMENDATIONS

A preliminary 3D model from SolidWorks has been produced based off of information gathered from surveys, interviews and observations of the Beas and Suketi River. (The appearance of benches and lights used in these images are subject to change based on what appeals most to the people of Mandi and the Municipal Council).

Features for Recreational Walkway

- ❑ 70 benches
- ❑ 70 street lights
- ❑ 1 railing
- ❑ Wide area of space for walking/jogging
- ❑ Material: Concrete
- ❑ 10 rain shelters
- ❑ 3 toilets
- ❑ Wide path to accommodate 2+ pedestrians side-by-side

Total Cost including All Features and Amenities: 20 Crore / 2.4 Million USD

PROJECTED LAYOUT

SURVEY AND INTERVIEW RESULTS

145 surveys with local residents/visitors as well as interviews with the Deputy Superintendent of Police and the Jr. Engineer of the Municipal Council have helped us determine the plausibility of and possibilities for a recreational walkway within Mandi town.

Most-visited Temples in Mandi

Tarna Temple, ***Triloknath Temple***, *Neelkanth Mahadev Temple, Hanuman Temple, Bhimakali Temple,* ***Guru Gobind Singh Ji Gurudwara,*** *and Neelkanth Mahadev Temple*

* Bolded names of temples appear from left to right above

Features and Amenities for Inclusion in Recreational Walkway

- ❑ Benches
- ❑ Street Lights
- ❑ Railing
- ❑ Space for walking/jogging
- ❑ Rain Shelters
- ❑ Bicycle Lane
- ❑ Fountain
- ❑ Swing

NO ANIMALS | **NO VEHICLES** (Autorickshaws, Mopeds, Cars, etc.) | **NO VENDORS**

PRELIMINARY MODEL

Above: Preliminary 3-D Model of Recreational Walkway by Victoria Bridge.

The structure framed by the 3-D model is the Tarna Temple, one of many temples to which the walkway will provide better accessibility.

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In Person and Online Survey Questions

1. How old are you?
a) 18-25
b) 26-40
c) 41-65
d) 65+

2. Are you a visitor or resident of Mandi?
a) Yes
b) No

* If you answered yes to question 2, skip question 3 to question 10.

3. In which region of Mandi do you live in based off of the map below?
a) A1
b) A2
c) A3
d) A4
g) Other (mark on map): _____

4. Which place of worship do you visit most often? Please write below. If none, leave blank.

5. How long does it take you to commute to that particular place of worship on average?
a) 1-15 mins.
b) 16-30 mins.
c) 31-45 mins.
d) 46-60 mins.

6. How do you commute to work/school?
a) Foot
b) Bike
b) Car
c) Bus
d) Autorickshaw

7. How long does it take you to commute to work/school on average?
a) 1-15 mins.
b) 16-30 mins.
c) 31-45 mins.
d) 46-60 mins.

8. On a scale from 1 to 10 how congested are the roads? 1 being the least congested and 10 being very congested

Ranking: 1 ----- 2 ----- 3 ----- 4 ----- 5 ------ 6 ----- 7 ----- 8 ----- 9 ----- 10

10. If given the option, would you rather use a walkway to commute to work/school?
a) Yes
b) No

11. Are you aware of what a recreational walkway is?
a) Yes
b) No
c) Not Sure

12. If built by the city of Mandi, would you use a recreational walkway along the Beas river?
a) Yes
b) No

13. How often would you use the walkway?
a) 1-2 days/week
b) 3-4 days/week
c) 3-5 days/week
d) 6-7 days/week

14. With whom would you use the walkway with?
a) Alone
b) Friends
c) Family
d) Coworkers
e) Classmates

15. Have you ever used a recreational walkway in another town?
a) Yes
b) No

16. If you answered yes to question 15, which town?

17. If you answered yes for question 15, please rate your experience.
a) Very satisfied
b) Satisfied
c) Neutral
d) Dissatisfied
e) Very dissatisfied

18. If you answered no for question 15, what do you recommend the city build instead?
a) Bridge
b) Road
c) Railway

Why, or why not?

19. Would you like to see exercise equipment along the Beas river walkway?
a) Yes
b) No
c) Indifferent

20. Would you recommend implementing a bicycle lane?
a) Yes
b) No

21.) Of the two pictures, which one of the walkways is more aesthetic, pleasurable to look at?
a.) Rome, Italy b.) Sunder Nagar, Himachal Pradesh

22. If the city of Mandi were to construct a walkway, how much money would you be willing to contribute?

a) I'm unwilling to contribute to the construction of a walkway.
b) ₹100 - ₹1,000
c) ₹1,000 - ₹10,000
d) More than 10,000

23. Do you think there are any potential threats that could negatively affect the walkway?

a) Yes
b) No

24. If you answered yes to question 24, please list any example(s) below.

_____

25. Do you think Mandi would benefit from a walkway?

a) Yes, for recreational use.
b) Yes, accessibility to place of worship.
c) Yes, for tourism.
d) Yes, for clearing congestion on streets

26. Which type of recreational facilities would you like to see on the walkway? Select more than one.

a) Benches
b) Street Lights
c)Fountain
d)Swing

e) Other

27. Do you think the walkway would effectively separate the mobility of pedestrians and vehicles?
a) Yes
b) No

Why, or why not?

28. Do you think the walkway would have a positive effect on the following below on Mandi residents?
a) I don't think the walkway could have any positive effect on Mandi's residents
a) Health
b) Wellbeing
c) Tourism
d) All of the above

Thank you for your time!

Interview Questions with the Deputy Superintendent of Police

Section I. Background Information

1. Occupation
2. Occupation Responsibility

Section II. Questions to the police officers on the proposal of the recreational walkway in Mandi town

1. How would you describe the traffic conditions in Mandi?
2. Do you think it would be helpful to implement a recreational walkway in Mandi? Why or why not?
3. If we were to implement a walkway (approx. 4.82 km), would there be police patrolling it throughout the day/night?
4. Do you think implementing a walkway in Mandi would help to alleviate traffic congestion?
5. Do you think implementing a walkway would pose any safety threats to the pedestrians using it?
6. Are there any specific areas in Mandi that would be unsafe to build a walkway near?
7. What permits are required to build a walkway?
8. What aspects can we add to our walkway to make it a safe environment?
9. What archeological preservation laws do we need to be aware of?
10. Currently, vending occurs throughout the City, including, sidewalks, streets, parks, alleyways and other locations. Would it be permitted for people to vend along the? walkway?
11. How do you think implementing a walkway would affect the surrounding environment?
12. What legal issues may we face while implementing a walkway?
13. What is the maximum height of Beas water level during the monsoon season.
14. May you provide written permission for us to use a Quadcopter/Drone nearby the Beas river.

Interview Questions with Jr. Engineer of the Municipal Council

Section I. Background Information

1. Occupation
2. Occupation Responsibility

Section II. Questions to the engineer on the feasibility of the recreational walkway and design specific questions.

1. Briefly discuss project proposal and project deliverables (Results from Surveys/Interviews, Preliminary layout of recreational walkway and 3D Model of portion of Walkway)
2. Given your expertise, do you think this is feasible in Mandi? Why or Why not? Will be parts that'll be difficult to build than others?
3. Given this map of the projected pathway (see figure #), who owns the land along the banks of the Bea's River? (Privately owned vs. Government owned)
4. What material do you suggest we use for the building of this walkway? What are the cost differences for concrete vs. other materials?
5. What is the cost of the following features that'll be placed on the walkway? (railings, light fixtures, benches, restrooms, steel supports for hanging wall, concrete material for walkway, and cow traps)
6. How far away should there be construction close to the walkway?
7. Constructing this walkway will be a long process, how will it be paid for?